

at presenting to senior students and investigators the results of recent work in a few of those branches which are at present attracting attention. It is supplementary to the text-books, and should prove of great value to those whom the subject more nearly concerns. The value of the work is enhanced by the author's choice of material, since he has selected those subjects with which he was specially familiar and on which he was able to write with a first-hand knowledge. Starting with the classic researches of Brown and Morris, the author deals in the first two chapters with the carbohydrates of the leaf in relation to photosynthesis and with the methods of estimating carbohydrates in plant extracts. This is followed by short chapters on the carbohydrates of the cellular cryptogams. Other chapters deal with osmotic pressure and its relation to plant distribution, and to morphological variations; the permeability of protoplasm and of other organic membranes; and the magnitudes of osmotic pressures and electrical conductivities in plants. A chapter on the functions of the wood is followed by an account of the plant oxydases and their relation to pigmentation, and the final chapter is on the oxydases in relation to plant pathology and to technology. At the end of the volume there is a bibliography classified under the headings of the subject-matter adopted in the text.

WORKS ON CIVIL ENGINEERING.

- (1) *American Civil Engineers' Pocket-Book*. Editor-in-chief, M. Merriman. Third edition, enlarged. Pp. ix+1571. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 21s. net.
- (2) *Parks and Park Engineering*. By Prof. W. T. Lyle. Pp. viii+130. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 5s. 6d. net.
- (3) *Masonry Dam Design, including High Masonry Dams*. By Dr. C. E. Morrison and Orrin L. Brodie. Second edition, revised and enlarged. Pp. ix+276. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 10s. 6d. net.
- (4) *Earth Pressure, Retaining Walls, and Bins*. By Prof. William Cain. Pp. x+287. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 10s. 6d. net.

(1) THE "American Civil Engineers' Pocket-Book" has already established an enviable reputation for trustworthiness and completeness, which is well maintained in the third edition. A new section of ninety-six pages on river and harbour works has been added, whilst important additions have been made in the other sections. The scope of the book is wide, each subject being written by a specialist in the particular branch dealt with, although the treatment is simple and requires a minimum of previous knowledge.

Valuable features of the book are the numerous

examples worked out where concise and accurate description would otherwise be difficult. Although the question of cost varies enormously with time and locality, the tables of prices of works executed will add greatly to the use of the volume.

In view of the importance of the subject to makers and users of machinery, it is somewhat disappointing to find only one short paragraph devoted to hardness tests of metals. We also think that it is time some of the work which has been carried out lately upon struts and columns should be incorporated.

This pocket-book is one which is probably destined to form a standard reference-book for every civil engineer.

(2) It is now generally recognised that amongst the best investments for an urban community is the provision of parks and recreation-grounds. Indeed, in several recent cases the actual appreciation in value of surrounding property following upon the transformation of waste land to this purpose has been greater than the outlay. A very readable book upon the subject of parks and park engineering has been written by Prof. W. T. Lyle, of Lafayette College, which, although dealing with the American aspect of the case, will be found useful by members of public bodies responsible for the planning of our cities and towns. The first chapter of the book deals with the acquisition of parks and their lay-out. Other chapters are concerned with the survey and design, while interesting and instructive articles on labour and contracts and construction should prove of great assistance to the non-professional man, and also to young and inexperienced engineers of construction. In his preface the author points out that "the art of the park engineer, though a specialty, is, however, not a narrow specialty. He must be proficient in matters pertaining to the acquisition of lands, and be well versed in a great variety of engineering operations, such as earth excavation, masonry, waterworks and sewerage construction, road building and lighting, and occasionally the construction of steel and reinforced-concrete bridges. He must also be a good expert witness." The scope is very wide, and can only be superficially treated in one volume. The book will undoubtedly fill a useful place and serve as an introduction to more specialised works on construction.

(3) During the last few years there has been considerable discussion amongst engineers as to what methods should be adopted and what assumptions made in the design of high masonry dams. The subject is of extreme importance, since we have, on one hand, large expenditure of money in providing margins of safety above those really necessary, and, on the other, the fact that failure must be rendered impossible. The most recent methods of calculation and design are very ably treated in Morrison and Brodie's "Masonry Dam Design," the second edition of which has just been published. In the revision the authors have amplified a number of points which were treated very shortly in the

earlier edition. Chapters on the overfall and arched types of dam have been added, and an excellent series of cross-sections of typical masonry dams, arranged chronologically, forms an appendix. The method of analysis followed is that due to Wegmann, used for the first time in connection with the design of the new Croton dam. The authors have amplified the analysis by a consideration of the uplift due to water penetrating the foundations or the horizontal joints of the masonry, and also by taking into account the ice-thrust exerted against the up-stream face of the dam when the reservoir is frozen over. The latter portion of the book is devoted to the problems of tension in the vertical sections near the toe, to which attention was first directed by L. W. Atcherly. Appendices i. and ii. contain the mathematical theory of arch dams. The book is one which should occupy a place in the library of all designers of masonry dams.

(4) Probably one of the most difficult problems which the engineering designer has to face is that concerned with the pressures which may exist at the back of retaining walls. Many mathematical theories have been evolved which assist materially in solving the problem, but the infinite variety of physical conditions met with in the earth's crust render exact calculations impossible in many cases. This difficulty is undoubtedly responsible for the comparatively small amount of experimental work available. The book on earth pressures just issued by the professor of mathematics in the University of North Carolina deals with the theory of soil pressures, covering a wide range of physical properties of earth, from those of Rankine, where the soil is assumed to be devoid of cohesion and subjected to no other external force than its own weight, to cases where surcharging and cohesion are taken into account.

Both analytical and graphical methods are employed, and the work is comprehensive in scope. The last chapter is devoted to a consideration of bin theory, the ordinary hopper-bin containing coal or ore and the deep bin such as those met with in grain silos being dealt with in an adequate manner. The stresses in wedge-shaped reinforced-concrete bins, such as occur frequently in the toes, heels, and counterforts of retaining walls, form the subject of an appendix, whilst some experiments made by the author on model retaining walls at the limit of stability are dealt with in Appendix ii. The book well repays the reader. It ought to serve a useful end.

THE GEOLOGY AND SUPPLY OF MINERAL OIL.

Principles of Oil and Gas Production. By Prof. B. H. Johnson and L. G. Huntley. Pp. xv + 371. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 16s. net.

THIS book should be of especial usefulness owing to its combination of practical information, including branches of the subject not

usually considered in general text-books on oil-mining, and its clear and accurate statements of scientific principles. The twenty-three chapters may be divided into three groups: the first is devoted to the chemistry, physical qualities, and geology of oil and natural gas; the second includes eleven chapters on the development and management of oil and gas wells; and the third, consisting of one chapter which occupies nearly a third of the book, gives a most useful summary of existing knowledge of the oil and gas fields of North America.

The most striking feature of the first division of the work is its clear expression of the reaction from the school which held that the one determining factor in oil geology is the folding of the beds. It is no doubt true that the folding has often largely determined the distribution of the oil, and is the best guide in the economic development of the field. There are, however, numerous cases in which the rocks are not folded, yet the concentration of the oil into pools is due to the factors which elsewhere drove it into the arches of the folds. The authors therefore devote especial attention to the texture of the beds, to the variation in the range of those most suitable for oil storage, and to the forces which have compressed the oil into pools. The authors discuss the origin of mineral oil, and firmly reject the inorganic theories. They recognise the wide range of oil throughout geological time, but that Cambrian and pre-Cambrian rocks are unlikely to contain it in commercial quantities. Important oilfields occur in the Ordovician and in all later systems.

In an interesting chapter on folds the authors urge more general agreement in the meanings of the terms "homocline" and "monocline," and set a good example of concession, as Prof. Johnson abandons his previously advocated use of "monocline" for beds with a uniform dip in one direction. He now accepts Daly's term "homocline" for a bed with one dip, and "monocline" in its more familiar sense for a one-limbed fold. Horizontal beds the authors describe as "aclines"—a perhaps unnecessary term. They introduce the term "chute" for the pitch of a minor fold, which is very different from its usual use in mining geology. The chapter on the laws and leasing of oil lands appears to be a clear synopsis of the American law; it quietly explains how to avoid by suitable terminology the legal decision that the oil or gas under a tract of land cannot be sold. They point out, too, that the oil and gas industries are hampered by anti-trust laws, which in some cases prevent reasonable economic co-operation and necessitate wasteful expenditure.

Perhaps the most valuable section of the book is the description of the oilfields of North America. It is illustrated by an excellent geological map of the continent and numerous diagrams of the special fields. The literature on them appears well up to date. The authors describe the fields, ranging from that of Lima-Indiana, which is unique as yielding its produce from Ordovician beds, to the still more remarkable oilfield among the salt-